

## **LOWER COLUMBIA RIVER AND ESTUARY RESEARCH NEEDS IDENTIFICATION WORKSHOP**

### **FLIPCHART NOTES – BREAKOUT SESSION 2**

#### **STRENGTHS OF THE KNOWLEDGE BASE**

- Approaching work from an ecosystem perspective, and with an eye to big driver (e.g., climate change)
- Preliminary conceptual model
  - Fish predation questions
- Attempts to link physics and biology
  - Efforts underway

#### **WEAKNESSES OF THE KNOWLEDGE BASE**

- Tidally influenced area between Bonneville and the estuary
- Role of invasive species
- Knowledge of primary productivity
- “Adult” – habitats, etc.
- Role of low-level contaminants and emerging contaminants
- Existing geomorphology
- Microbial ecology – to understand links
- Don’t know how to describe what we are measuring

#### **KEY UNCERTAINTIES IN THE KNOWLEDGE BASE**

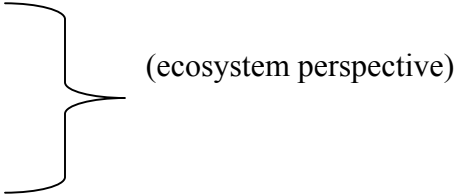
- How are actions now going to impact the future?
  - Consequences
  - Sustainability
- Evaluation capacity
  - How do we process information?
  - Who makes the decisions?
- Endpoint not clearly defined
  - Needed for clarity and to identify gaps, strengths, weaknesses, etc.
- How dynamic does the system have to be in order to be healthy? (How far do we need to go?)
- Lack of baseline information on where the system was pre-disturbance
- Quality and quantity of sediment load as it relates to restoration potential

#### **QUESTION 1:      WHAT RESEARCH WOULD IMPROVE UNDERSTANDING OF HOW VARIOUS SALMON LIFE-HISTORY STRATEGIES FUNCTION IN THE ESTUARY?**

- Understanding of anthropogenic factors
- Hammond database (data recovery)\*

- Need to mine the data
- Catch data from many sites throughout estuary/shore: 64-74, 77-84
- Limitations on techniques to identify what stock, ESU fish from
  - Need more information than just hatchery vs. wild differentiation)
- Look to other reports' recommendations
- Focus on estuary but need to recognize that fish come from all over system
  - Focus on ESUs

**QUESTION 2:        WHAT RESEARCH WOULD SUBSTANTIALLY  
CONTRIBUTE TO DEVELOPMENT AND APPLICATION OF  
AN ECOSYSTEM-BASED APPROACH TO SALMON  
HABITAT RESTORATION?**

- Function of wetlands as:\*
  - Filter for contaminants
  - Habitat for species
  - Nutrient supply source
  - Sediment trapping
  - Accretion rates
  - Contaminant history
  - Competition between hatchery and wild salmon
  - Potential competition with American Chad\*
  - Inventories of where fish are distributed across the estuary
    - Concern with only going to inventory
  - Food limitation data
  - In-lab experiments getting at mechanisms by which habitat affects fish performance
  - What would it take to get system back to “macrodetritus”?
  - How much do the yearlings use the estuary?
  - Pit tagging technology enhancements
  - Genetics information
  - Ecosystem focus
    - e.g. contaminants, yes for impacts on fish, but think more broadly
  - Resolve conceptual models
    - Research to identify any weaknesses in the conceptual model
  - Research aimed at creating a long-term database to determine temporal and spatial variability in primary and secondary production (as it relates to salmonids)\*
  - Estuarine turbidity maximum\*
    - Where is it located?
    - Movement?
    - Macrodetrital/micro?
    - Corps workshop?\*
  - In considering conceptual frameworks – derive into decision making tool
    - Adaptive management – (are you meeting goal or not? Why?)
  - Detailed bathymetric survey
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- Flow
  - What are the constraints?
  - Can they be manipulated differently?
- Dredging
  - How can we use the sand?
  - Variety of options
- Conceptual model?
  - Given what you know, how close are we to broad buy-in to one CM?
  - How much effort would it take to get there?
    - Social exercise to agree on format
- Assessment of potential sediment loading resulting from land recovery/reclaim efforts
  - linkage with hydrodynamic model to see where sediments may be depositing
- Summary of all other recommendations (SARE, etc) or the workshop CD
- Long-term benthic and plankton sampling program
- Good measures of fish health and fitness
  - Continued support of existing efforts
- When looking at food web – not just what fish eat but what eat fish (birds, mammals)
- Contaminants – levels of concern for fish

### **QUESTION 3:        WHAT ARE THE MOST IMPORTANT RESEARCH NEEDS?**

*Note that the \*'s above (in questions 1 and 2) indicate additional priority areas*

- Data mining
- Monitoring of on-going/new restoration
  - Or an overview of what others should be focusing on
  - How do you measure success?
- Integration of efforts (non-federal and federal) to restore estuarine processes
  - LCREP
  - Share information
- Links between physics and biology
  - Database of observed/simulations data
  - Access to everyone
  - Physical habitat opportunity
- Wetlands studies/functions
  - (Predictive modeling)
  - Restoration
- Monitoring – not just create a protocol but have to implement, get results
- Maintain PIT tagging technology in the estuary
  - Variety of sources (ESU's)
- Adults role in the plume or estuary
- Create/continue improving tracking technology
  - Survival estimation
- Salmonid life-history use in the estuary
- Integrative projects – should be major criteria for research

- Regional Mapping
  - Fish habitat, channels (accessibility)
  - Vegetation surveys (elevations of plants)
  - Available acreage
  - Substrate
  - Bathymetry
  - Primary productivity (remote sensing)
  - Topography
  - Accessibility (10,000 acres)
- Take advantage of ongoing efforts (especially tidal wetlands)
  - What do we need to know to make sure they will be successful?
  - How the system works -> very applied
- Criteria for habitat selection and prioritization
- Information necessary to measure success
- Have to maximize probability of success
  - Will lead to more money

**QUESTION 4:        WHAT ARE THE MAIN CONSTRAINTS TO ACCOMPLISHING THE  
CRITICAL RESEARCH?**

- Restoration timelines and knowledge available not always in sync – rather both moving and need to build off each other
- Stakeholders and general public seem to be driving these efforts more than they should be (based on limited knowledge)
- Math analogy – elegant solutions vs. brute force
  - Complexity/dynamic system
- Modern hydrograph in the Columbia
  - Variability over time will require really long-term commitment
- Access to land
- Funding
- Research on metrics of performance